

REMARKS

Claims 1-27 are pending in the present application. Claims 1-6 are canceled above. Claims 7, 14-17, 19-23 and 26-27 are amended above. New claim 28 is added above. No new matter is added by the claim amendments. Entry is respectfully requested.

Applicant affirms the election of Group II, claims 7-27. Claims 1-6 are canceled above without prejudice to the filing of divisional or continuation applications.

Claim 17 stands objected to for an informality stated in the Office Action. Claim 17 is amended above to be dependent on claim 15, which includes an antecedent for "N-type impurities." Entry of the amendment and removal of the objection are respectfully requested.

Claims 7, 13, 14, and 21-27 stand rejected under 35 U.S.C. 102(b) as being anticipated by Sun (U.S. Patent No. 5,496,764). Claims 8-12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Sun in view of Moore, *et al.* (U.S. Patent No. 6,051,480 - hereinafter "Moore"). Claims 15-18 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Sun in view of Ema, *et al.* (U.S. Patent No. 5,789,788 - hereinafter "Ema"). Claims 19-20 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Sun in view of Mitani, *et al.* (Japan Patent No. 10-223497 - hereinafter "Mitani"). Reconsideration of the rejections and allowance of the claims are respectfully requested.

Claim 7 is directed to a method of manufacturing an SOI wafer. An isolation insulating film is formed on a front face of a first semiconductor wafer to define an active region and a bonding insulating film is formed on a front face of a second semiconductor wafer. A pad insulating film is formed on the front face of the first semiconductor wafer. After forming the pad insulating film, an ion implantation process is performed so as to form a P-well and an N-well in the active region. Respective front faces of the first semiconductor wafer including the active region having the P-well and the N-well and the second semiconductor wafer are pre-bonded. The bonded first and second semiconductor wafers are heated at a predetermined

temperature to completely bond the first and second semiconductor wafers with each other. A back face of the first semiconductor wafer is polished to a bottom level of the isolation insulating film.

In the present invention of amended independent claim 7, a “pad insulating film” is formed on the front face of the first semiconductor wafer. Further, after forming the pad insulating film, an “ion implantation process” is performed so as to “form a P-well and an N-well in the active region.” These features of the present invention are illustrated, for example, at least at FIGs. 3-5 of the present specification. In this example, a pad insulating film 120a is formed on the first semiconductor wafer in the active region (see FIG. 3 and page 7, lines 18-19 of the present specification). After forming the pad insulating film 120a, N-type impurities are implanted in a portion of the active region using ion implantation, forming an N-well, and P-type impurities are implanted in a portion of the active region using ion implantation, forming a P-well (see FIGs. 4-5 and page 7, line 28 to page 8, line 10 of the present specification). The film 120a prevents ions implanted in the substrate silicon during the ion implantation process from diffusing, in order to reduce damage to the surface of the silicon, or in order to prevent metal ions from becoming doped during the ion implantation process (see page 7, lines 20-24 of the present specification).

It is submitted that Sun does not teach or suggest the present invention as claimed in amended independent claim 7. Specifically, it is submitted that Sun fails to teach or suggest “forming a pad insulating film on the front face of the first semiconductor wafer” and “after forming the pad insulating film, performing an ion implantation process so as to form a P-well and an N-well in the active region” (emphasis added), as claimed. Instead, Sun teaches the formation of an N-type doped region 21 in the substrate 20 (see Sun, FIG. 2 and column 2, lines 30-31). No such “pad insulating film” is present during formation of the N-type doped region 21 in Sun. After formation of the doped region 21, silicon trenches 31 are formed in the substrate 20 (see Sun, FIG. 3 and column 2, lines 34-35). An insulating layer 41 is formed over the substrate and within the trenches (see Sun, FIG. 4 and column 2, lines 47-48). The insulating

layer 41 is polished to form isolation structures 41 (see Sun, FIG. 5 and column 2, lines 57-61). After forming the doped region 21, a thin oxide layer 61 is optionally formed (see Sun, FIG. 6 and column 2, lines 61-66). The substrates 10 and 20 are then bonded together (see Sun, FIG. 7 and column 3, lines 13-15). A polishing step is performed to remove any remaining substrate 20 and doped region 21 that extend above the trenches 41 (see Sun, FIG. 8 and column 3, lines 28-34). A base region 91 including a P-type dopant is then optionally formed in a portion of the doped region 21 (see Sun, FIG. 9 and column 3, lines 54-57). Since the doped region 21 in Sun is formed before forming the thin oxide layer 61, it follows that Sun does not teach “after forming the pad insulating film, performing an ion implantation process so as to form a P-well and an N-well in the active region” (emphasis added), as claimed in amended independent claim 7.

In addition, it is submitted that Sun fails to teach or suggest “pre-bonding the respective front faces of the first semiconductor wafer including the active region having the P-well and the N-well, and the second semiconductor wafer” (emphasis added), since, at the time the first and second wafers are bonded at FIG. 7 of Sun, the structure only includes the N-well 21 and not both an N-well and P-well. Sun teaches formation of the N-type doped region 21 in the second substrate 20 before bonding the first substrate 10 to the second substrate 20, and formation of a base region, including the P-type dopant, following bonding of the substrates 10, 20. Therefore, at the time of bonding, the second substrate 20 of Sun includes only the N-well, and not both the N-well and P-well.

Accordingly, it is submitted that Sun fails to teach or suggest the invention set forth in amended independent claim 7. Reconsideration of the rejection and allowance of amended independent claim 7 are therefore respectfully requested. With regard to the various dependent claims, it follows that these claims should inherit the allowability of independent claim 7 from which they depend.

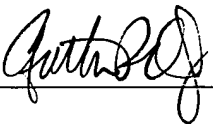
Closing Remarks

It is submitted that all claims are in condition for allowance, and such allowance is respectfully requested. If prosecution of the application can be expedited by a telephone conference, the Examiner is invited to call the undersigned at the number given below.

Respectfully submitted,

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